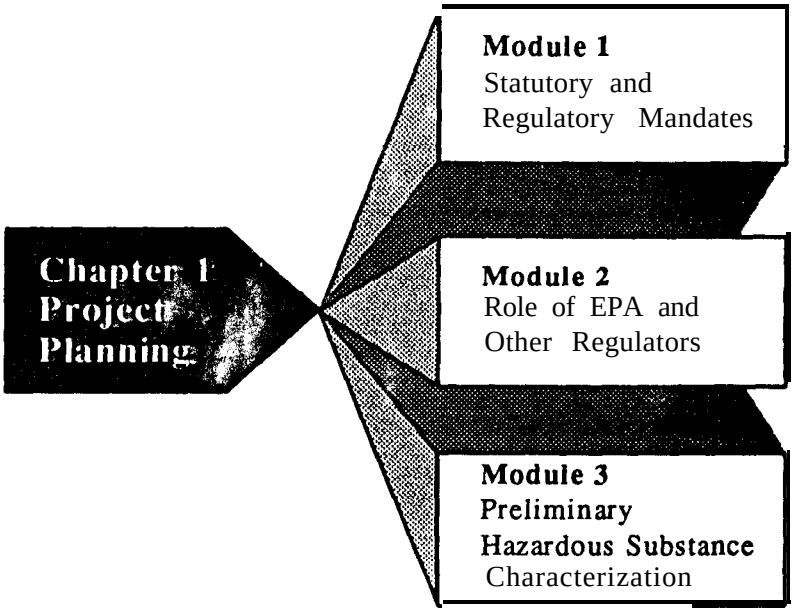
PART II: MODULE DESCRIPTIONS

CONTENTS

CHAPTER 1

Project Planning



CONTENTS

CHAPTER 1: PROJECT PLANNING

Familiarity with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) is essential in order to understand the responsibilities of federal agencies engaged in remediation planning for hazardous waste sites. Planning the project requires considerable understanding of the types and nature of chemical contaminants present at the site, their locations, and the applicable statutes, regulations, and specific federal agency guidance for the environmental resources adversely affected by the contaminants being evaluated. Planning should consider ecological issues to be addressed in the ecological work plan, both in evaluating the current site condition and in comparing various remediation alternatives.

The three modules presented in this chapter address steps to be taken in advance of ecological work plan preparation. The material presented assumes that a detailed ecological assessment is necessary to support the overall project baseline risk assessment and feasibility study. The participation of the EPA Biological Technical Assistance Group (BTAG) and ecologists from other federal or state agencies in the review and oversight of the DOE project should be recognized by the DOE environmental restoration program manager (ERPM)[1] in planning the project. A thorough knowledge of ecosystems in the project area and knowledge of past releases and contaminants are important elements in defining the objectives and scope of the ecological assessment.

Planning should consider **ecological issues to be addressed in the ecological work plan both in evaluating the current site condition and for comparing various remediation alternatives.**

The EPA (1992b) has issued guidance to federal agencies on work scope development for ecological assessments. This publication is one issue in a series of supplemental guidance reports under the series name of "ECO Update" intended to supplement the *Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual* (EPA 1989c). The role of the BTAGs, elements of ecological assessment work scope, and ways of evaluating contractor qualifications are discussed in the ECO Update guidance. Project ecologists should refer to this guidance as well as other recent publications that address ecological risk assessment (e.g., Bartell et al. 1992; Maughan 1993; Suter 1993). These publications provide an overview of the process, suggested methods, and case studies.

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[1] Throughout this guidance document, the term "ERPM" is used synonymous with the terms On-Scene-Coordinator and Remedial Project Manager. The On-Scene-Coordinator and Remedial Project Manager are defined in the NCP, Part 300.5, as "the federal officials designated by the lead agency to coordinate, monitor, or direct remedial or other response actions under Subpart E of the NCP."

The DOE also has recently issued more specific guidance on RI/FS techniques (DOE 1993a). A draft report has also been issued by DOE on policy and implementation planning for conducting ecological risk assessments at DOE facilities (DOE 1993b).

References

Bartell, S.M., et al., (eds.), 1992. *Ecological Risk Estimation.* Lewis Publishers, Chelsea, Mich.

DOE, 1993a, *Remedial Investigation/Feasibility Study (RI/FS) Process and Techniques Guidance, Interim Draft Final*, U.S. Department of Energy, Office of Environmental Guidance, Washington, D.C., May.

DOE, 1993b, *Policy Framework and Implementation Plan for Using Ecological Risk Assessment at DOE Facilities,* DOE/RL/01830-H16, U.S. Department of Energy, Washington, D.C.

EPA, 1989c. *Risk Assessment Guidance for Superfund — Vol. II, Environmental Evaluation Manual*, report EPA/540/89/001, U.S. Environmental Protection Agency, Washington, D.C..

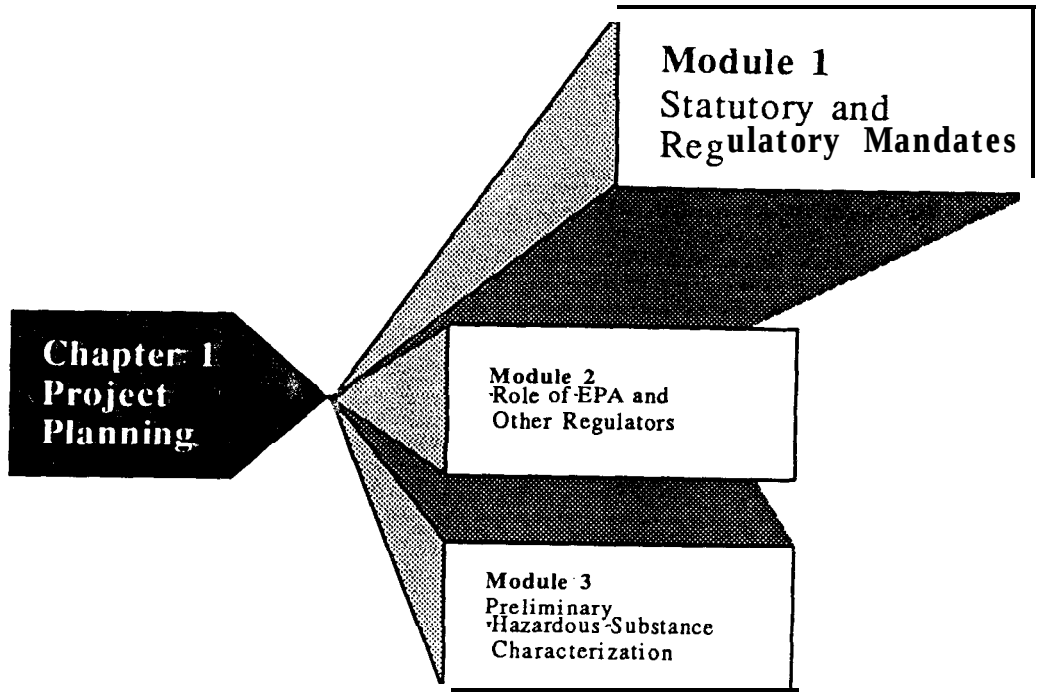
EPA, 1992b. *ECO Update, Developing a Work Scope for Ecological Assessments,* U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Intermittent Bulletin 1(4):1-15, Washington, D.C.

Maughan, J.T., 1993. *Ecological Assessment of Hazardous Waste Sites.* Van Nostrand Reinhold, New York.

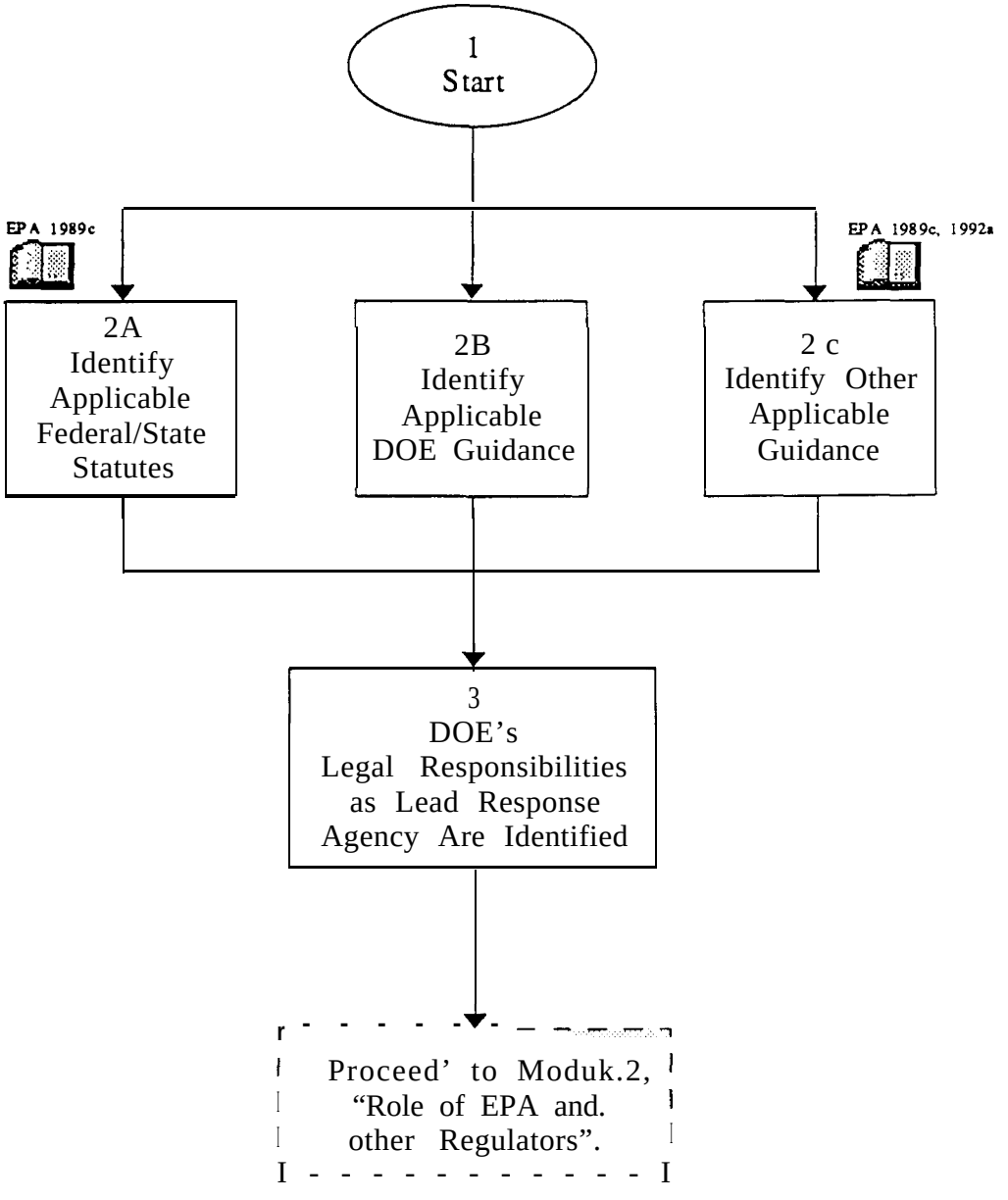
Suter, G.W., II, 1993. *Ecological Risk Assessment.* Lewis Publishers, Chelsea, Mich.

MODULE 1:

STATUTORY AND REGULATORY GUIDANCE MANDATES



Module 1: Statutory and Regulatory Guidance Mandates



MODULE 1: STATUTORY AND REGULATORY GUIDANCE MANDATES

Step 1 Start.

Step 2a Early in the review process, DOE should identify all federal and state statutes, and their implementing regulations, that are applicable to the project (EPA 1989c). The NCP defines these requirements as applicable or relevant and appropriate requirements (ARARs). ARARs can be specific with respect to a chemical, its location, or action. Table 1.1 (next page) provides a listing of ARAR examples. The DOE ERPM is responsible for determining which of the ARARs would be applicable to the CERCLA project. At DOE CERCLA sites, executive orders (Nos. 11990, 11988) pertaining to wetlands and floodplains may also be considered location-specific ARARs.

Various federal statutes pertain to ecological resources at the CERCLA site. The Endangered Species Act, Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act require federal agencies to examine proposed actions relative to species impacts pertaining to habitat losses or direct losses of individual organisms. The Fish and Wildlife Service (FWS 1979) provides a selected list of federal laws and treaties that pertain to ecological resources. The DOE ERPM also may need to examine potential impacts of site remediation to air quality and water quality requirements established under the Clean Water Act and Clean Air Act. Any dredging or fill actions in navigable waters of the United States require an evaluation by the U.S. Army Corps of Engineers to review the action and, if necessary, grant a permit under Section 404 of the Clean Water Act. The permit requirement is waived for dredge and fill actions that take place on the DOE CERCLA site proper.

The EPA (1991a) has identified the following general types of ARARs: (1) ***chemical-specific:*** health or risk management-based methodologies that, when applied to site-specific conditions, result in the establishment of numerical values (e.g. chemical-specific concentrations in a given medium); (2) ***location-specific:*** restrictions placed upon the concentration of hazardous substances or the conduct of activities solely because they are in special locations such as wetlands; and (3) ***action-linked:*** technology or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

Step 2b DOE guidance exists for ecological evaluations at CERCLA sites where DOE has responsibility as the natural resource trustee (DOE 1991). This document provides guidance DOE should follow in assessing injury to natural resources from exposure to "hazardous substances" and in determining monetary compensation from injury

TABLE 1.1 Examples of Applicable or Relevant and Appropriate Requirements (ARARs)

Chemical-Specific ARARs

- Safe Drinking Water Act and regulations (federal and/or state)
- Resource Conservation and Recovery Act (RCRA) Groundwater Protection Standards (federal and state-equivalent)
- Nuclear Regulatory Commission Standards for Protection Against Radiation
- State radiation protection standards
- State radiation emission standards
- Clean Water Act and regulations (federal)
- State Water Quality Standards
- Toxic Substances Control Act and regulations
- National Emission Standards for Radionuclide Emissions from DOE facilities
- EPA Radiation Protection Standards for managing and disposing of spent nuclear fuel, high-level, and transuranic radioactive wastes
- Clean Air Act
- National Primary and Secondary Ambient Air Quality Standards

Location-Specific ARARs

- Endangered Species Act
- Bald and Golden Eagle Protection Act
- Migratory Bird Treaty Act
- RCRA treatment, storage, and disposal (TSD) siting requirements
- Executive Order 11990 "Protection of Wetlands"[a]
- Executive Order 11988 "Floodplain Management"[a]
- Clean Water Act, Section 404, wetlands protection
- Protection of areas that are part of the National Wildlife Refuge System
- Fish and Wildlife Coordination Act
- Wild and Scenic Rivers Act
- National Historic Preservation Act

Action-Specific ARARs

- RCRA TSD facility requirements
- RCRA land disposal restrictions
- U.S. Army Corps of Engineers dredging and tilling permits
- National Pollutant Discharge Elimination System
- Clean Air Act: National Emission Standards for Hazardous Air Pollutants

[a] Executive Orders 11990 and 11988 are codified for DOE at 10 CFR 1022 (Appendix C). 10 CFR 1022 is a location-specific ARAR for DOE.

done to natural resources. Ecologists should refer to the DOE CERCLA Reference Book (Oak Ridge National Laboratory [ORNL] 1993) for further information on regulatory requirements of the RI/FS process. This reference book, updated regularly by the DOE Office of Environmental Guidance, contains a current copy of CERCLA and implementing regulations for CERCLA evaluations, including information on preliminary site evaluations, such as ecological toxicity tests and bioaccumulation determinations.

Step 2c EPA guidance has been published on ecological assessments and procedures pertinent to CERCLA sites (EPA 1989b, 1989c, 1992a).

Step 3 DOE has identified and documented a preliminary list of ARARs for the project. DOE, as a lead agency, and oversight agencies shall notify each other of ARARs in writing no later than the early stages of the comparative anaiysis of remedial action alternatives [NCP Part 300.430(e)9]. As lead response agency, DOE also must notify oversight agencies of other legal responsibilities. Ecologists should use the statutes identified in Step 2a above as background information in scoping the initial draft of an ecological work plan.

References

DOE, *1991. Natural Resource Trusteeship and Ecological Evaluation for Environmental Restoration at Department of Energy Facilities,* report DOE/EH-0192, U.S. Department of Energy, Washington, D.C.

EPA, 1989b. *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference,* report PB89-205967, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989c. *Risk Assessment Guidance for Superfund — Vol. II, Environmental Evaluation Manual*, report EPA/540/89/001, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1991a. *Risk Assessment Guidance for Superfund: Volume l-Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals),* Office of Emergency and Remedial Response, Publication 9285.7.01B, U.S. Environmental Protection Agency, Washington, D.C.

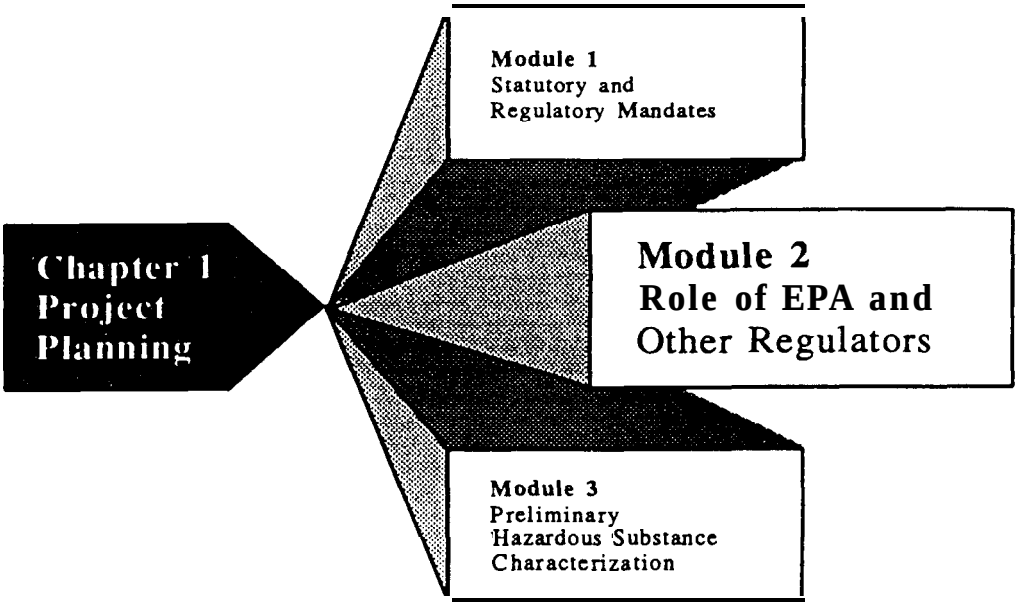
EPA, 1992a. *Framework for Ecological Risk Assessment,* report EPA/630/R-92/001, U.S. Environmental Protection Agency, Washington, D.C.

FWS, 1979. *Selected List of Federal Laws and Treaties Relating to Sport Fish and Wildlife,* U. S. Department of Interior, Fish and Wildlife Service, Washington, D.C.

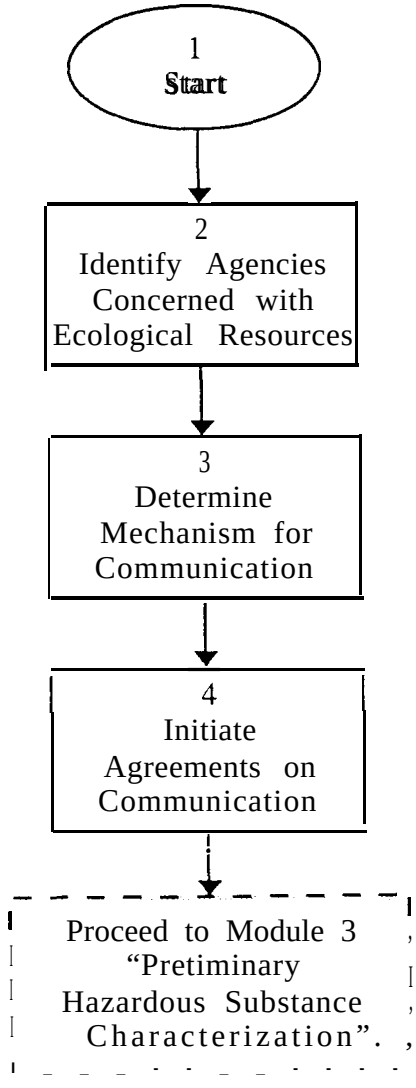
ORNL, 1993. *Environmental Guidance Program Reference Book, Comprehensive Environmental Response, Compensation, and Liability Act,* report ORNIJM-2261, Oak Ridge National Laboratory, Oak Ridge, Tenn.

MODULE 2:

ROLE OF EPA AND OTHER REGULATORS



Module 2: Role of EPA and Other Regulators



MODULE 2: ROLE OF EPA AND OTHER REGULATORS

Step 1 Start.

Step 2 Roles and responsibilities of various federal, state, and local agencies should be identified at the project outset. The EPA and state agencies charged with the responsibility as the point of contact for federal agencies initiating a remediation project can provide valuable assistance. Project ecologists should identify points of contact for each federal and state agency and Indian Tribe having regulatory responsibility for natural resources. The EPA regional office for the CERCLA site being evaluated can provide information on federal and state agencies having regulatory or statutory responsibility for biological resources. **Appendix E** lists the EPA BTAG coordinators who serve as contacts for obtaining this information.

Step 3 The U.S. Fish and Wildlife Service (FWS), Army Corps of Engineers (COE), and appropriate state agencies (e.g., state wildlife agencies and departments of natural resources) and Indian Tribes should be contacted regarding their legal responsibilities and desired role in the CERCLA remediation process. Initial contacts often will provide an overview of a state agency's roles in past CERCLA actions and their likely involvement in the current project.

Step 4 In cases where an NRDA is warranted, administrative responsibilities of DOE and other agencies are defined in 43 CFR 11.32. These procedures define how a damage assessment plan should be developed. For responsibilities of other agencies on hazardous substance remediation projects, the user should refer to the NCP procedures, particularly 40 CFR Part 300.430, Remedial Investigation/Feasibility Study and Selection of Remedy (ORNL 1993). The DOE (1991) issued guidance on its responsibilities as a natural resource trustee.

State involvement in the RI/FS process and guidance on agreements between the EPA and states is provided in Part 300.515(d). When DOE is the lead agency, input to the EPA will be needed on any agreements reached with government agencies (e.g., state department of natural resources, fish

A ***Federal Facility Agreement*** typically includes (1) a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions; (2) procedures for resolving disputes, assigning penalties for nonperformance, and ensuring public participation in the RI/FS process; (3) identification of what primary documents (i.e., RI/FS work plan, sampling and analysis plan, baseline risk assessment, remedial investigation. feasibility study, proposed remediation plan, and record of decision) DOE must prepare and submit to the EPA and state agencies; (4) secondary documents such as treatability study reports and reports on preliminary analysis of alternatives; and (5) progress reports submitted at a specified frequency.

and game department) or Indian Tribes involved with remediation planning and response.

A federal facility agreement (FFA) is drawn up to define involvement of the EPA, DOE, and appropriate state agencies in the RI/FS process.

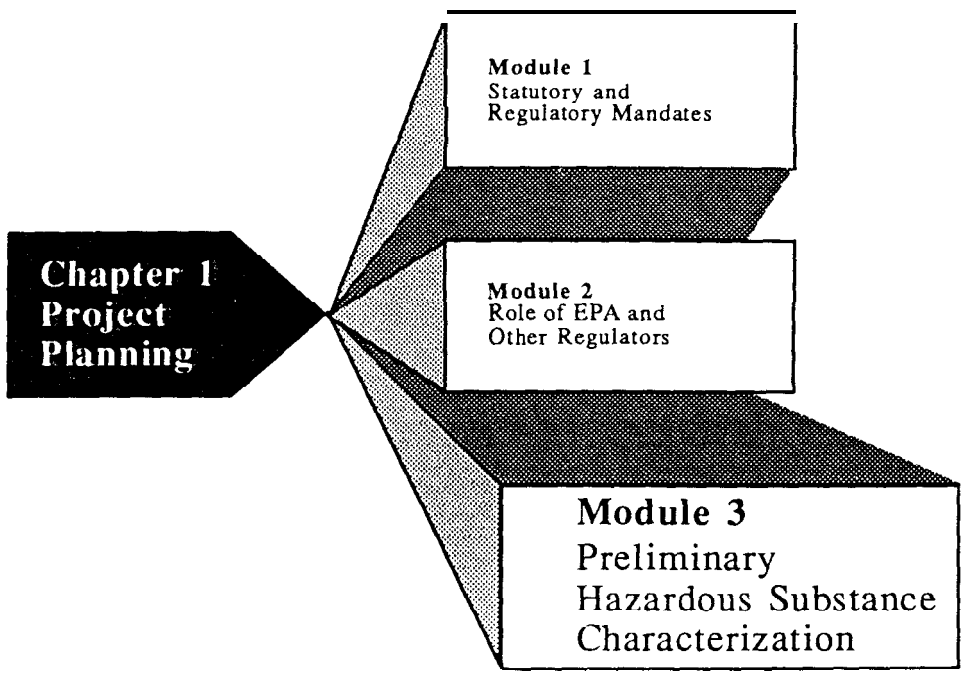
References

DOE, 1991. *Natural Resource Trusteeship and Ecological Evaluation for Environmental Restoration at Department of Energy Facilities,* report DOE/EH-0192, U.S. Department of Energy, Washington, D.C.

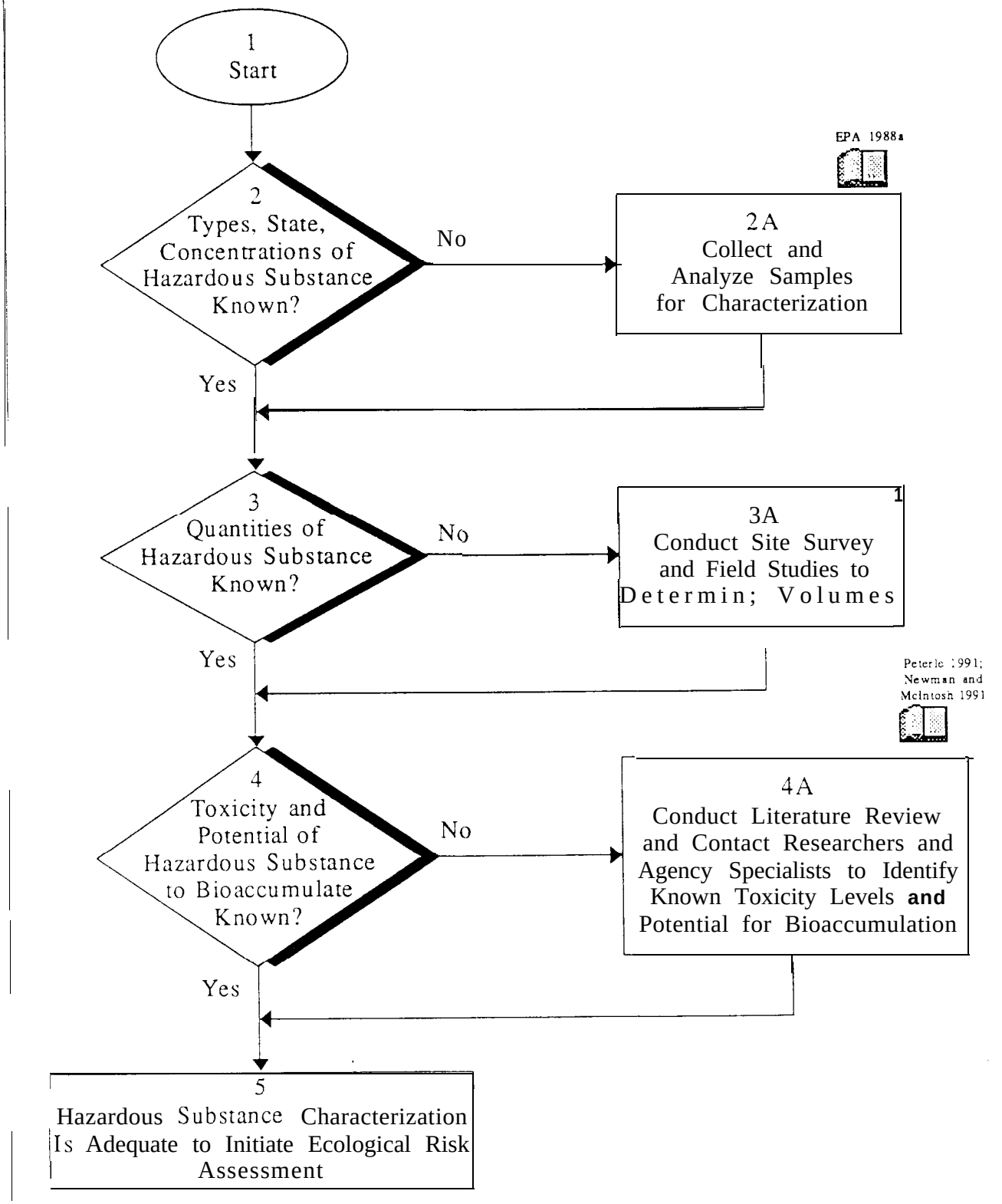
ORNL, 1993. *Environmental Guidance Program Reference Book, Comprehensive Environmental Response, Compensation, and Liability Act,* report ORNLJM-2261, Oak Ridge National Laboratory, Oak Ridge, Tenn.

MODULE 3:

PRELIMINARY HAZARDOUS SUBSTANCE CHARACTERIZATION



Module 3: Preliminary Hazardous Substance Characterization



MODULE 3: PRELIMINARY HAZARDOUS SUBSTANCE CHARACTERIZATION

Step 1 Start.

Step 2, 2a The DOE, as the lead agency, must characterize the nature of and threat posed by the hazardous substances, pollutants, and contaminants.[2] The DOE ERPM must develop an overall RI/FS work plan after completing remedial site evaluations (see NCP, 40 CFR 300.420). As part of the overall RI/FS process, existing information on contaminant type, state, and concentration must be obtained as a starting point in determining the potential threat to human health and the environment. For example, contaminants occurring at concentrations above regional background levels may be contaminants of concern; whereas those at or below regional concentrations would in all likelihood not receive further consideration as contaminants of concern (see **Appendix A, Section A.3 and Table A.1).** This information may be available from past studies conducted at the CERCLA site or from records of past activities generating hazardous substances or resulting in hazardous substance releases. When chemicals are being identified or eliminated as contaminants of concern on the basis of frequency of occurrence, the following points should be considered: (1) if only a few samples are taken, each sample constitutes a significant percentage of the data set (a chemical detected in only one sample should not necessarily be eliminated from further consideration); (2) to be conservative, a known toxicant detected infrequently in an area of high ecological concern should be retained for further consideration; (3) if an infrequently detected contaminant

Identifying Contaminants of Concern

The following factors should be considered when identifying contaminants of concern: (1) ***environmental media concentration*** representing ecological exposure pathways, (2) ***frequency of occurrence*** (defining prevalence in site media); (3) ***background levels*** (indicating concentrations not attributable to the site); ***(4) bioavailability*** (presence of contaminant in a form that can affect biota); (5) ***physicochemical properties*** (e.g. volatility and solubility); (6) ***potential for bioconcentration and bioaccumulation*** (tendency to occur in biota at higher concentrations than surrounding environment); (7) potency (amount of toxicant capable of producing adverse effects); and (8) ***effects*** (e.g., acute and chronic responses) (EPA 1991b).

[2] These materials are those contaminants of concern occurring in a form and concentration expected to adversely affect human health and the environment. The list of substances is developed on the basis of the eight factors shown in the text box above.

is toxic at concentrations below its detection limit, it should be considered further in the evaluation process because it may be present in toxic amounts in other samples; and (4) infrequent detection could result from intermittent releases or changes in contaminant mobility. Sample collection and analysis will likely be necessary to fully characterize the hazardous substance. The DOE ERPM should follow EPA guidance in preparing the RI/FS Work Plan (EPA 1988a).

Step 3, 3a Site reconnaissance-level surveys may reveal information on the volume of hazardous substances in question. DOE and operating contractor files may contain records on the volumes of hazardous substances disposed of on-site.

Step 4, 4a Literature reviews (e.g., Peterle 1991; Newman and McIntosh 1991) may reveal information on toxicity, persistence in the environment, and propensity to bioaccumulate. Contacts with researchers and agency specialists are obvious means of obtaining current information on the hazardous substances being evaluated (see **Appendix A, Section A.3.4)**

step 5 If information exists on all aspects of the hazardous substance, the RI/FS process may proceed to initiation of an ecological risk assessment and to the development of remedial action alternatives [NCP, Part 300.430, 2(d)]. For most sites, the hazardous substance cannot be completely characterized on the basis of preliminary information, thus necessitating the implementation of scoping and site characterization (Chapter 2).

References

EPA, 1988a. ***Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final,*** report EPA/540/G-89/004, OSWER Directive 9335.3-01, U.S. Environmental Protection Agency, Washington, D.C.

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Newman, M.C., and A.W. McIntosh (eds.), 1991. ***Metal Ecotoxicology, Concepts and Applications.*** Lewis Publishers, Inc., Chelsea, Mich.

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